ONTARIO MINISTRY OF ENVIRONMENT
36936000025473

1970

OPERATING SUMMARY

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ELMIRA

water pollution control plant

TD
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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

TD Elmira : water pollution control
367 plant.
.A56 82203
E455
1970

Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

Once again we have the privilege of submitting to you our latest detailed report on financial progress and technical activity at your water pollution control plant.

The statistical information contained in this annual operating summary will undoubtedly be a useful barometer of efficiency. Of particular interest will be the comments and recommendations of the regional operations engineer, who was intimately connected with day-to-day operation throughout 1970.

Together with the extensive cost data provided, this information should assist greatly in your general understanding of the problems met and dealt with, and in furnishing a yardstick for possible future expansion.

DS Caverly

D.S. Caverly,
General Manager.

D McTavish

D.A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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Assistant Director
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Regional Supervisor
A. C. Beattie

Operations Engineer
B. W. Hansler

135 St. Clair Avenue West
Toronto 195

ELMIRA

water pollution control plant

operated for

THE TOWN OF ELMIRA

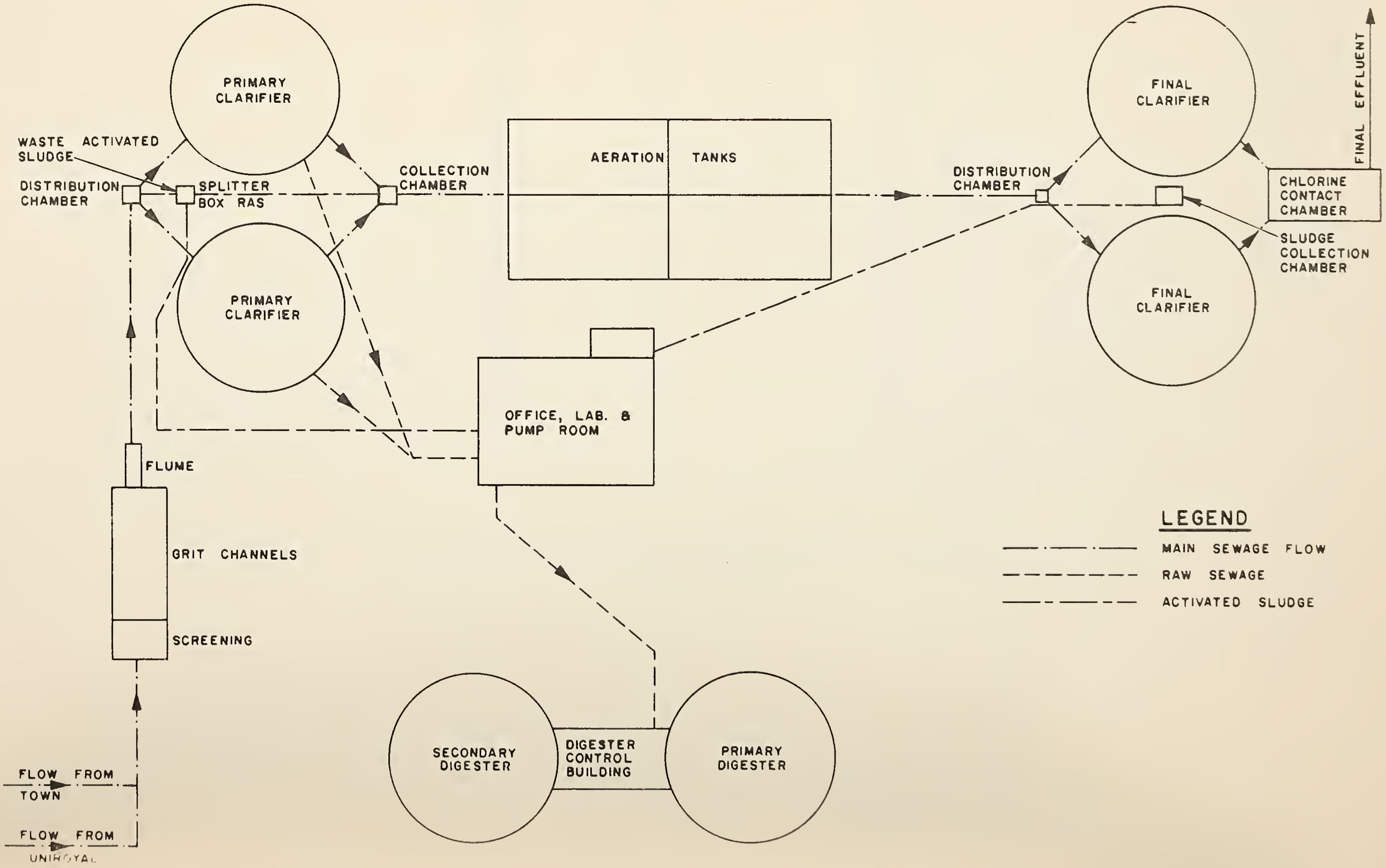
by the

ONTARIO WATER RESOURCES COMMISSION

1970 ANNUAL OPERATING SUMMARY

TOWN OF ELMIRA W. P. C. P.

SCHEMATIC OUTLINE OF PLANT SHOWING SEWAGE FLOW



DESIGN DATA

PROJECT NO. 2-0096-61

DESIGN FLOW		DESIGN POPULATION	5,000
Municipal	0.50 mgd		
Industrial	0.18 mgd		
Total	0.68 mgd		
BOD		SS	
Municipal	170 mg/l	Municipal	300 mg/l
Industrial	1100 mg/l	Industrial	320 mg/l
Combined	420 mg/l	Combined	306 mg/l

PRETREATMENT -- INDUSTRIAL WASTES

Type --
Balancing tank plus
neutralization facilities

PRIMARY TREATMENT

Screening

One coarse manually-cleaned bar screen

Grit Removal

Type: Grit channels, manually cleaned

Primary Sedimentation

Type: Link Belt
Size: Two 40' dia x 8' swd (125,000 gal)
Retention: 4.42 hours
Loading: Surface, 270 gal/ft^2/day
Weir, 2,700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration
Size: Four 30' x 30' x 14.2' (48,00 cu ft or 300,000 gal)
Retention: 10.6 hours

Aerators

Type: Four Ames-Crosta

Secondary Sedimentation

Type: Rex Chainbelt
Size: Two 45' dia x 7' swd (22,300 cu ft or 139,000 gal)
Retention: 4.9 hours
Loading: Surface, 214 gal/ft^2/day
Weir, 2,400 gal/ft/day

CHLORINATION

Type: F & P

Chlorine Contact Chamber

Size: Two 30' x 6' x 4.74' (1,700 cu ft or 10,600 gal)
Retention: 22.5 min

OUTFALL

- to Canangagique Creek

SLUDGE HANDLING

Digestion System

Type: Two-stage digestion
Primary - One 30' dia tank with two Dorr mixers (97,100 gal)
Secondary - One 30' dia tank (15,200 cu ft or 94,700 gal)

'70 REVIEW

FLOWS	DAILY FLOW mil gal	OCCURRING IN THE MONTH OF	MONTHLY FLOW mil gal	OCCURRING IN THE MONTH OF
Average	.55	—	16.8	—
High	.94	April	29.1	April
Low	.34	August	10.5	August

GENERAL

The Elmira Water Pollution Control plant is a conventional secondary treatment plant designed to treat a flow of 680,000 gallons per day, 500,000 gpd from the Town of Elmira and 180,000 gpd from Uniroyal Limited. It has been adequately staffed with two men following the resignation of an operator on April 30, 1970.

During November, lime slurry was added to the raw sewage in order to improve the effluent quality. There was some improvement in the removal of BOD and suspended solids. The average phosphate removal was 66% during the test period compared to the normal removal of 40%.

Difficulties were experienced throughout the year in providing efficient biological treatment of the wastes. Influent phenol concentrations in excess of 2,500 ppb and the variation in the nature of these wastes did not allow the activated sludge to acclimate. The resultant non-flocculant sludge produced a poor quality effluent. The anaerobic digesters were not used because the wastes seriously inhibit the digestion process.

EXPENDITURES

A total of 201 million gallons of sewage was treated in 1970: 153.9 million gallons from the Town and 46.9 million gallons from Uniroyal, at a cost of $38,968.22. The expenditures which include the costs for the study to improve plant efficiency were about 7 percent less than the $41,145.28 operating costs incurred in 1969.

PLANT FLOWS and CHLORINATION

The average daily flow from the Town was 0.421 million gallons, an increase of 10%, with the Town design flow of 0.5 mgd being exceeded 30% of the time.

The average daily flow from Uniroyal Ltd. was 0.129 million gallons with the design flow of 0.18 mgd being exceeded 10% of the time.

The combined flows to the plant averaged 0.55 mgd, exceeding the design capacity about 20% of the time. The average daily flow is less than 4% greater than in 1969.

A total of 5,230 lbs. of chlorine was used to disinfect the plant effluent.

PLANT EFFICIENCY

The average BOD of the Town's sewage was 242 mg/l and the average suspended solids concentration, 179 mg/l. These values are 11% and 17% lower than the respective 1969 averages. It is of interest that the decrease in BOD and suspended solids concentration is approximately equal to the increase in flow from the Town.

While the average BOD of the wastes from Uniroyal decreased to 581 mg/l from 1,107 mg/l in 1969, the design concentration of 1,100 mg/l was still exceeded about 20% of the time. The suspended solids concentration averaged 121 mg/l.

The combined influent averaged 336 mg/l BOD and 148 mg/l suspended solids, a decrease in concentration of 26% and 20% respectively.

Both effluent quality and removal efficiency showed some improvement over last year. The average effluent BOD and suspended solids concentrations were 50 mg/l and 74 mg/l respectively compared with 77 and 95 mg/l in 1969. Reduction, of BOD averaged 82% and suspended solids concentration 52%, slightly greater than the 77% and 47% of the previous year.

CONCLUSIONS

The effluent quality from the Elmira WPCP is very poor and can be attributed directly to the industrial wastes, analysed mainly as chloro-substituted phenols, received from Uniroyal Ltd. Although Uniroyal Ltd. has taken steps to correct its waste problems in the past year, the plant still does not produce an effluent approaching OWRC objectives.

PROJECT COSTS

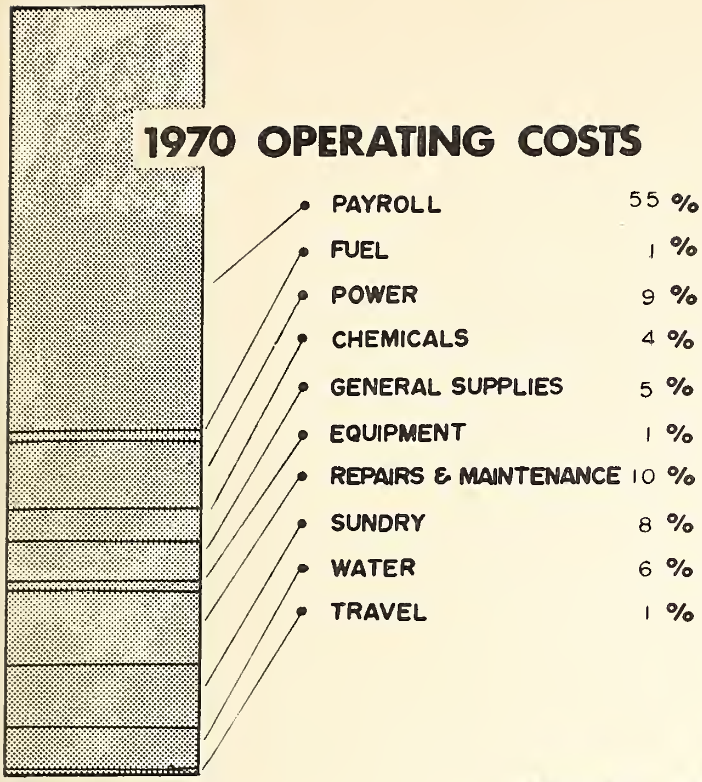
NET CAPITAL COST (Final)	$582,424.56
DEDUCT - Portion financed by CMHC/MDLB (Final)	488,534.01
Long Term Debt to OWRC	$ 93,890.55
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1970	$ 13,660.97

Net Operating	$ 38,890.46
Debt Retirement	1,895.00
Reserve	3,272.19
Interest Charged	5,260.34
TOTAL	$ 49,317.99

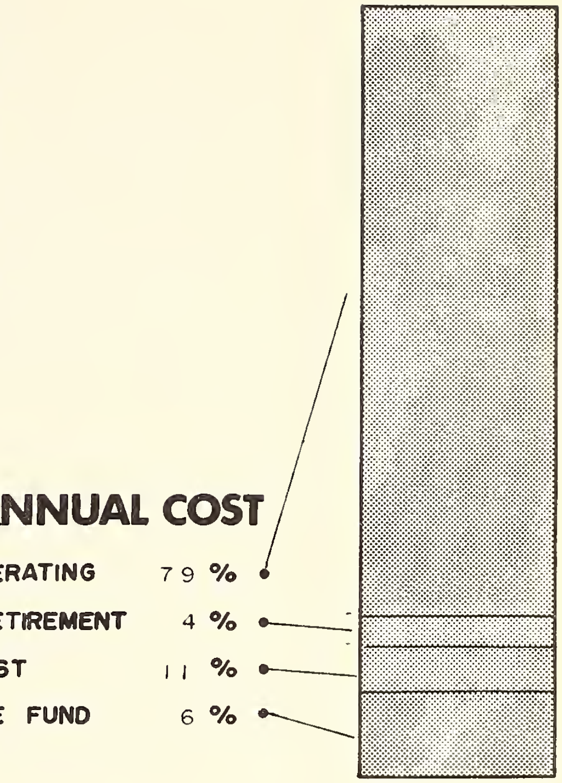
RESERVE ACCOUNT

Balance @ January 1, 1970	$ 14,336.47
Deposited by Municipality	3,272.19
Interest Earned	1,006.84
	$ 18,615.50
Less Expenditures	-
Balance @ December 31, 1970	$ 18,615.50

1970 OPERATING COSTS



TOTAL ANNUAL COST



Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1966	202.88	$45,931.52	$226.40	10 cents
1967	255.85	41,031.41	161.82	7 cents
1968	255.00	42.343.07	162.13	6 cents
1969	193.744	41,145.28	212.37	6 cents
1970	201.2	38,968.22	93.70	7 cents

MONTHLY OPERATING COSTS

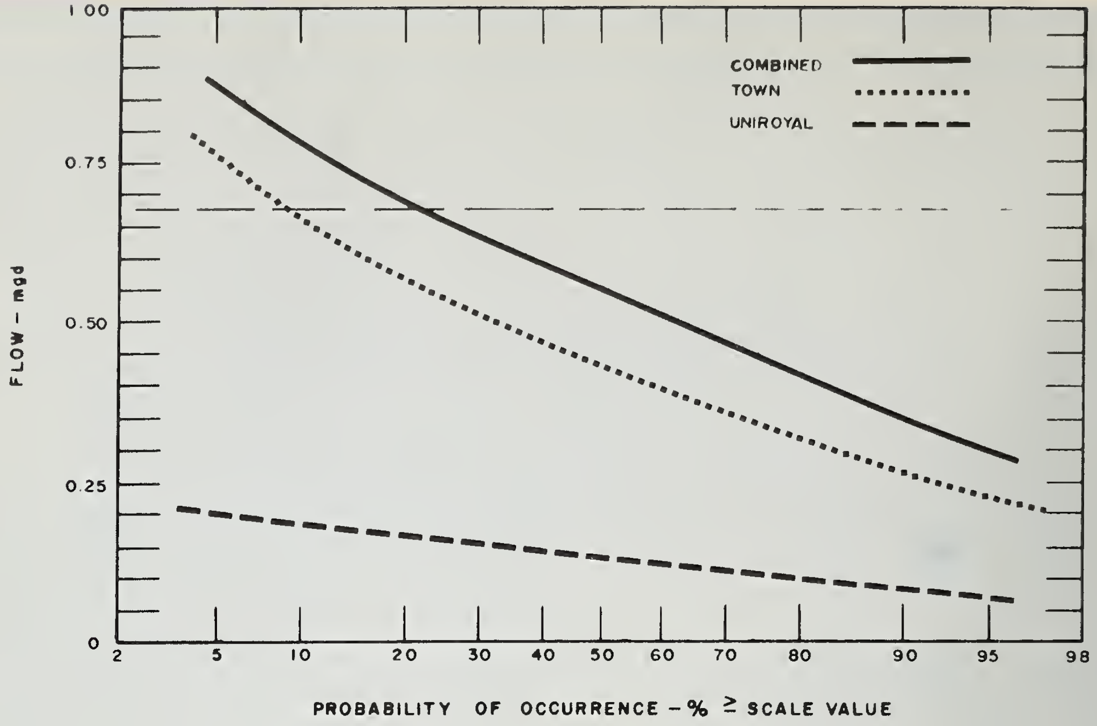
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	3587.56	2624.52	55.34	-	290.81	-	53.38	46.20	88.99	162.54	265.78	
FEB	2713.64	1874.82	-	197.18	277.74	-	140.60	15.90	48.91	125.49	-	33.00
MAR	3265.74	1929.26	-	80.90	310.80	-	150.61	297.00	239.46	97.43	152.78	7.50
APR	5269.07	1865.46	-	74.12	310.10	-	80.06	-	2829.82	100.51	-	9.00
MAY	3127.06	1787.35	-	25.13	279.48	-	101.71	103.48	311.97	187.43	298.11	32.40
JUNE	2142.08	1319.24	-	-	251.30	-	228.92	38.78	-	283.14	-	20.70
JULY	2567.95	1273.62	-	19.15	221.73	-	175.60	-	21.37	388.12	453.36	15.00
AUG	2315.49	1915.20	-	4.68	202.65	-	90.57	-	35.59	53.90	-	12.90
SEPT	3291.97	1284.47	416.54	-	213.15	-	93.50	-	14.06	786.48	470.57	13.20
OCT	2416.49	1356.60	406.36	18.11	231.53	-	93.25	-	-	239.48	-	71.16
NOV	2867.20	1431.63	447.08	-	209.48	1431.85	286.97	-	-	641.62	414.07	4.50
DEC	3403.97	1330.04	262.22	96.83	523.25	(34.50)	379.20	(5.50)	263.10	230.25	317.48	41.60
TOTAL	38968.22	19992.21	1587.54	516.10	3322.02	1397.35	1874.37	495.86	3853.27	3296.39	2372.15	260.96

BRACKETS INDICATE CREDIT

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $1825.00

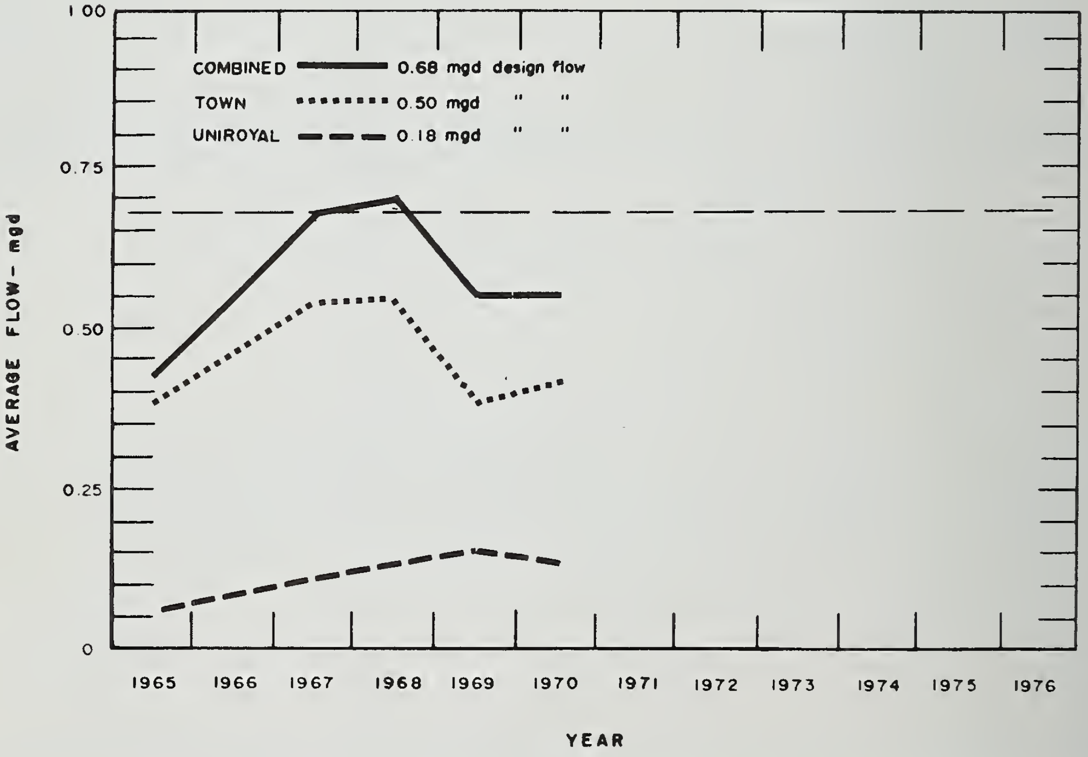
Note: Total does not include year-end adjustments.

PROCESS DATA



FLOWS

NOMINAL CAPACITY — — —



PLANT FLOWS and CHLORINATION

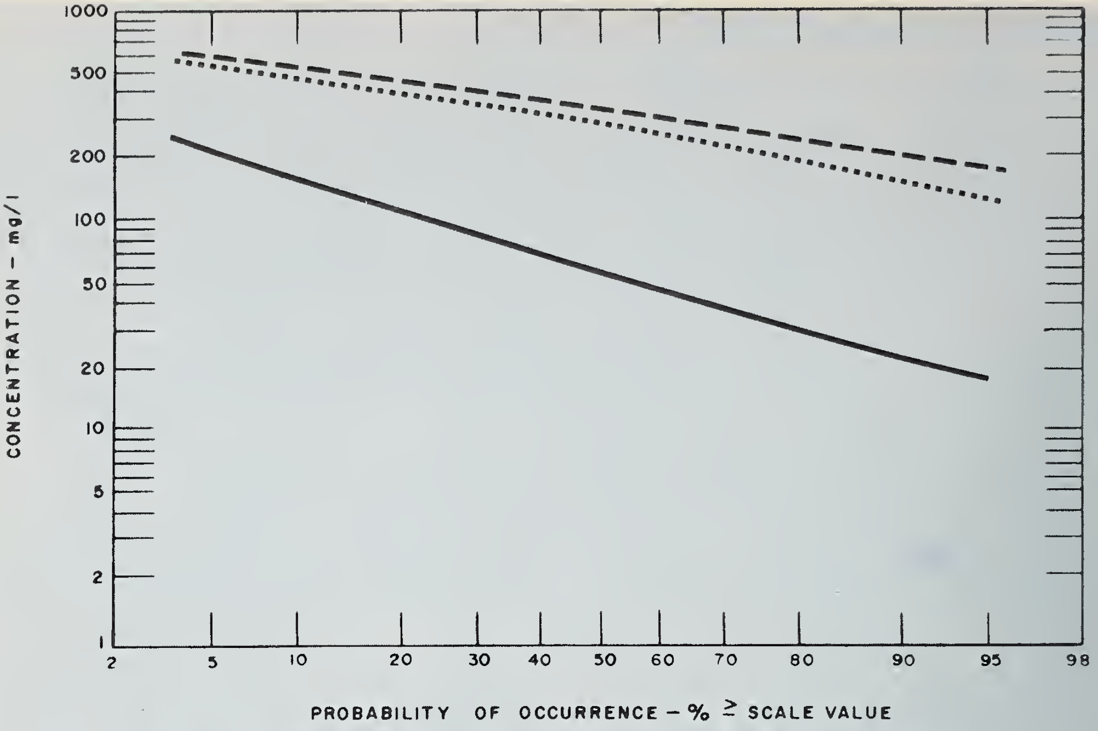
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED pounds	DOSAGE mg/l
JAN	13.0	.42	.6	.3	460	3.5
FEB	13.9	.50	.6	.4	420	3.0
MAR	20.6	.67	.9	.5	470	2.3
APR	29.1	.94	1.9	.5	440	1.5
MAY	16.8	.54	1.1	.4	350	2.1
JUNE	14.1	.47	.5	.2	450	3.2
JULY	14.2	.46	.7	.3	440	3.1
AUG	10.5	.34	.4	.2	450	4.3
SEPT	12.5	.42	.8	.3	400	3.2
OCT	16.8	.54	.7	.4	460	2.7
NOV	19.2	.64	1.3	.5	440	2.3
DEC	20.5	.66	1.6	.5	450	2.3
TOTAL	201.2	-	-	-	5230	-
AVERAGE	-	.55	MAX 1.9	MIN. .2	-	2.6

OPERATING SUMMARY

Week Ending		UNIROYAL			TOWN			COMBINED				
									Raw		Final	
		Flow MG	BOD	SS	Flow	BOD	SS	Flow MG	BOD	SS	BOD	SS
Jan.	3	.335	-	-	.774	-	-	1.109	-	-	-	-
	10	.763	1500	150	1.873	420	260	2.636	700	225	280	160
	17	.873	1100	105	1.902	440	290	2.775	650	195	170	150
	24	1.009	1100	95	1.933	800	155	2.942	560	85	300	135
	31	1.144	1400	30	2.362	170	110	3.506	500	125	150	65
Feb.	7	1.182	800	40	2.427	210	205	3.609	500	110	100	85
	14	1.259	850	35	2.114	260	185	3.373	360	150	100	90
	21	1.250	800	45	2.078	220	520	3.328	500	420	90	105
	28	1.244	700	125	2.288	190	175	3.532	600	210	80	160
Mar.	7	1.284	900	100	2.722	320	300	4.006	360	260	95	130
	14	1.291	500	100	2.825	190	205	4.116	360	160	44	85
	21	1.262	650	95	3.172	200	130	4.434	360	130	44	35
	28	1.324	-	-	4.479	-	-	5.803	-	-	-	-
Apr.	4	1.275	700	50	6.007	220	175	7.282	280	150	28	70
	11	1.278	460	40	8.719	110	130	9.997	190	150	34	90
	18	1.093	580	115	3.223	190	160	4.316	440	140	85	80
	25	.827	1300	840	5.357	180	115	6.184	300	130	44	75
May	2	.659	1100	210	3.807	170	110	4.466	280	125	32	45
	9	.669	550	145	2.954	240	160	3.623	400	290	38	110
	16	.641	-	-	2.835	180	250	3.476	260	170	24	65
	23	.632	460	50	2.962	340	140	3.594	380	100	40	40
	30	.763	220	160	3.731	220	180	4.494	240	110	30	30
June	6	1.016	320	80	2.762	220	140	3.778	280	140	32	60
	13	1.188	220	80	2.255	220	180	3.443	240	180	20	40
	20	.988	480	65	2.224	220	260	3.212	280	165	30	45
	27	.932	400	120	2.080	240	250	3.012	300	200	95	40

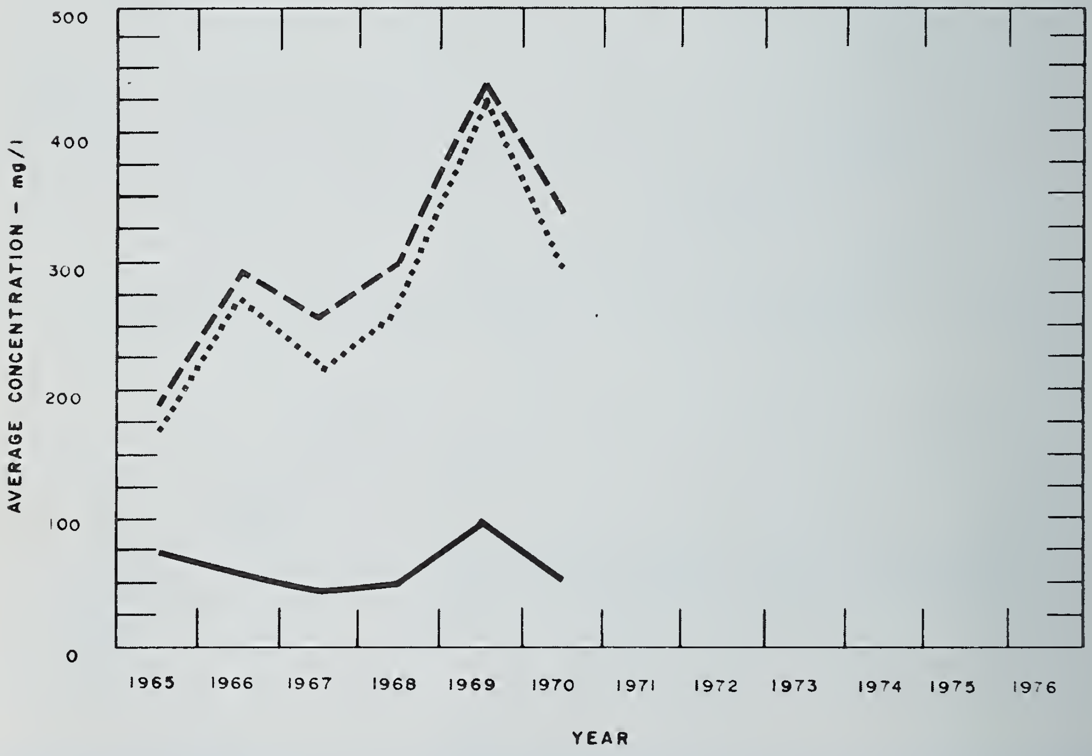
July	4	.743	-	-	1.972	-	-	2.715	-	-	-	-
	11	.822	440	130	2.210	300	160	3.032	320	200	30	60
	18	.954	440	100	2.692	180	120	3.646	220	110	16	40
	25	1.044	360	170	2.489	260	280	3.533	150	170	14	130
Aug.	1	.876	-	-	1.918	320	140	2.794	-	-	-	-
	8	.623	500	200	2.048	-	-	2.671	380	130	8	40
	15	.119	-	-	2.206	-	-	2.325	-	-	-	-
	22	.490	600	50	1.918	400	140	2.408	440	120	28	20
	29	.566	60	70	1.529	340	290	2.095	260	190	-	155
Sept.	5	.704	140	300	1.809	400	140	2.513	280	190	38	90
	12	.850	-	-	1.847	-	-	2.697	-	-	-	-
	19	.918	420	60	1.816	200	130	2.734	340	120	30	60
	26	.845	-	-	1.617	-	-	2.462	440	120	22	70
Oct.	3	.856	300	130	3.491	220	110	4.347	280	190	34	50
	10	.846	650	110	2.855	130	140	3.701	240	140	30	60
	17	.850	440	90	2.690	130	140	3.540	260	140	22	70
	24	.854	260	120	3.003	160	170	3.857	190	120	22	40
	31	.863	-	-	3.161	-	-	4.024	-	-	-	-
Nov.	7	.866	460	230	3.650	200	170	4.516	300	150	38	90
	14	.804	900	250	3.434	190	120	4.238	400	120	22	35
	21	.777	150	220	3.128	150	220	3.905	220	110	20	70
	28	1.014	420	80	4.006	150	140	5.020	260	110	50	70
Dec.	5	.958	600	30	5.120	180	130	6.078	280	90	16	70
	12	.775	120	45	4.061	260	70	4.836	190	50	26	50
	19	.647	320	20	3.372	200	140	4.019	220	130	28	30
	26	.604	480	20	3.304	160	120	3.908	240	130	120	50
	31	.437	420	15	2.711	200	190	3.148	220	150	24	40
Total		46.886			153.922			200.808	15450	6810	2623	3410
Average		.129	581	121	.421	242	179	.550	336	148	58	74
			*	*		**	**		***	***	**	***

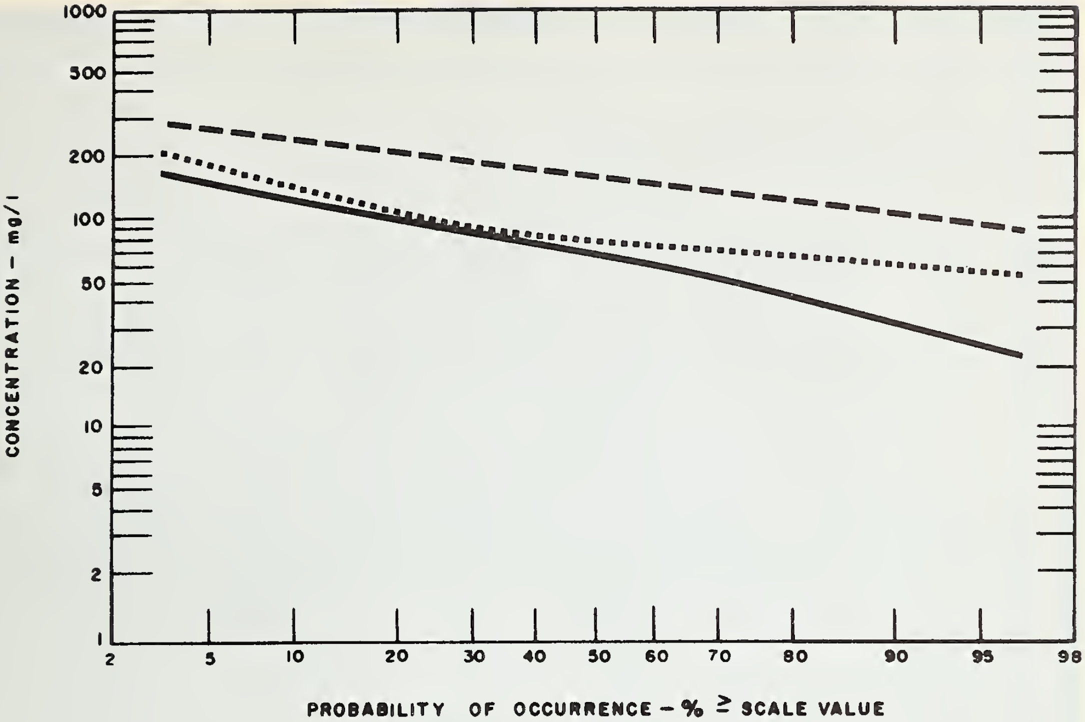
*	44 samples
**	45 samples
***	46 samples



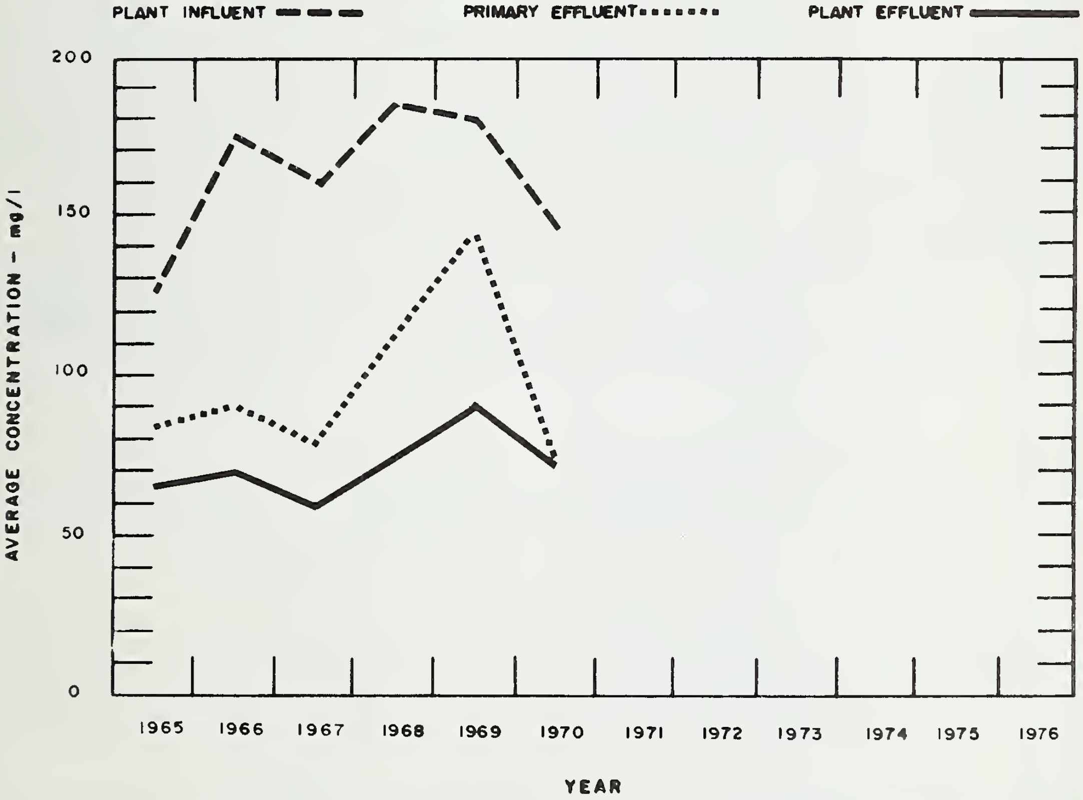
BIOCHEMICAL OXYGEN DEMAND

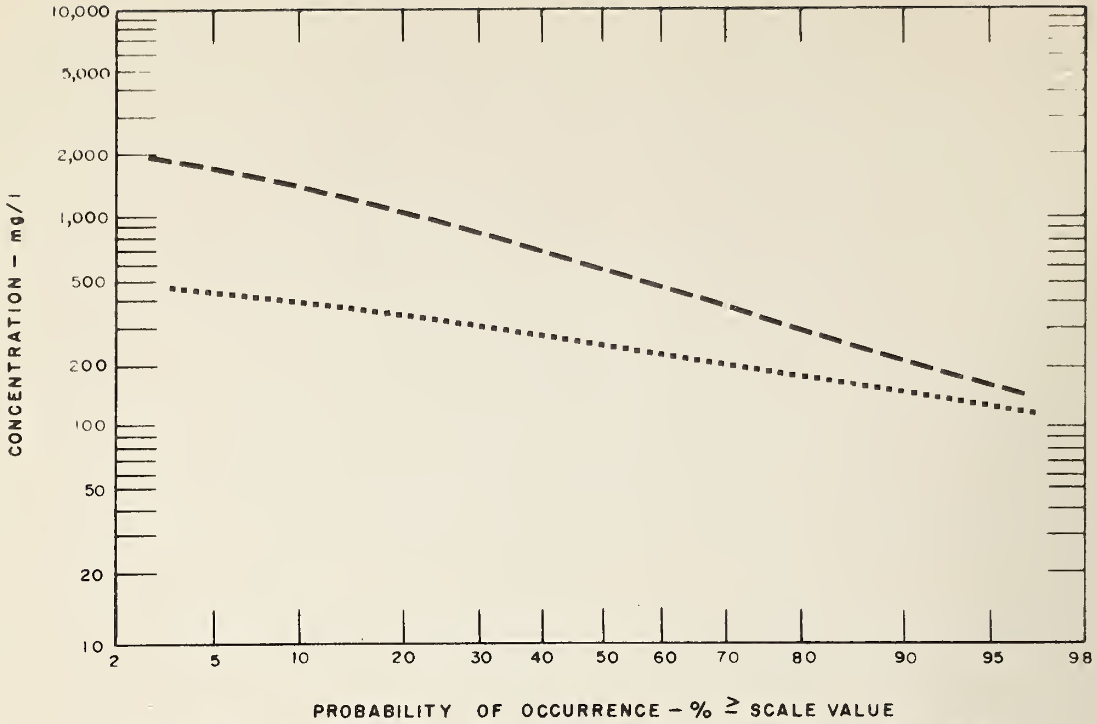
PLANT INFLUENT – – –   PRIMARY EFFLUENT ••••••   PLANT EFFLUENT ———



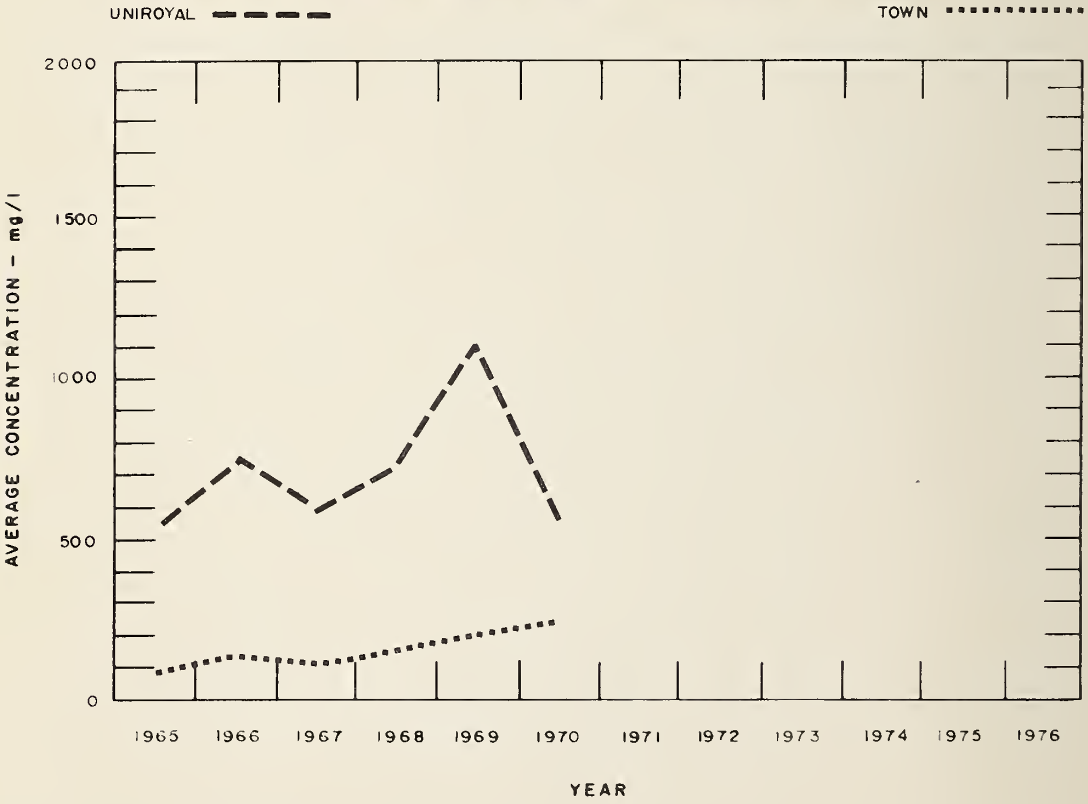


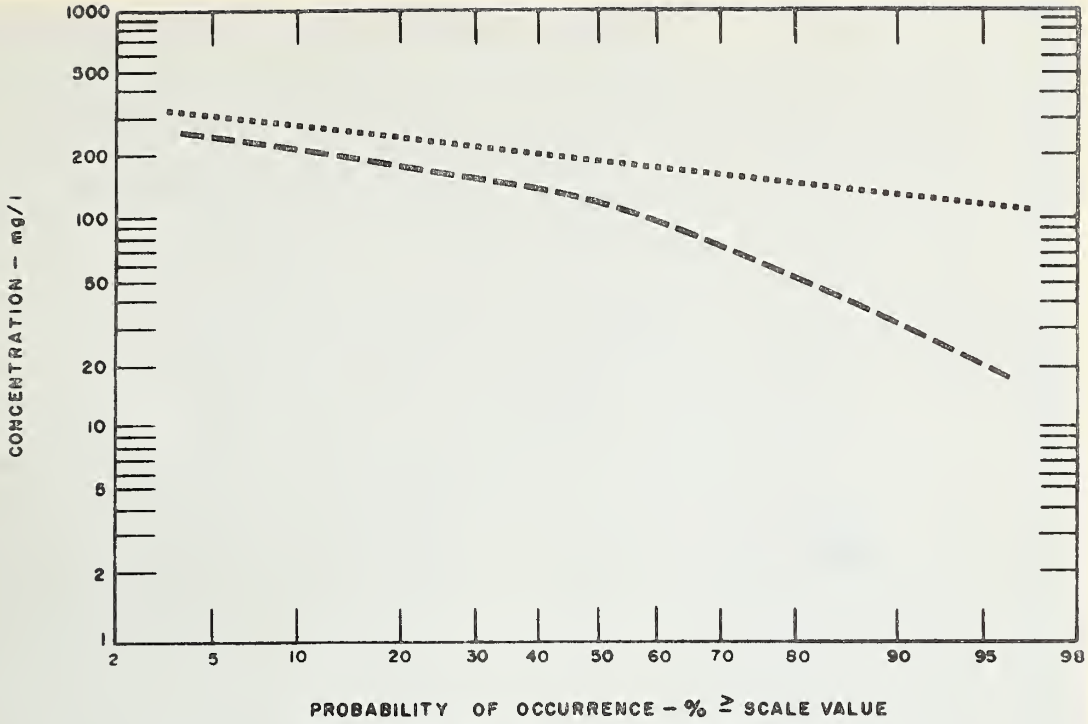
SUSPENDED SOLIDS



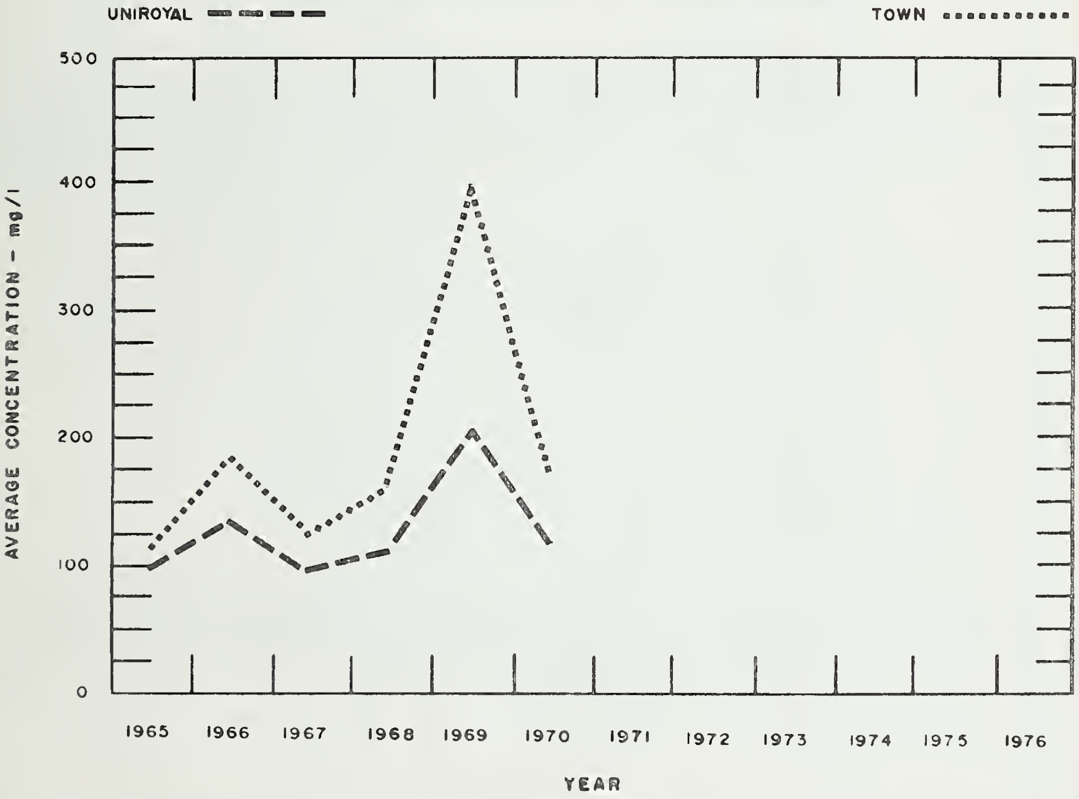


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS



PLANT EFFICIENCY

MONTH	BIOCHEMICAL OXYGEN DEMAND						SUSPENDED SOLIDS						GRIT REMOVED
	INFLUENT		EFFLUENT		REDUCTION		INFLUENT		EFFLUENT		REDUCTION		
	n	mg/l	n	mg/l	%	10^3 pounds	n	mg/l	n	mg/l	%	10^3 pounds	cu ft
JAN	4	603	4	225	63	49	4	157	4	127	19	4	–
FEB	4	490	4	92	81	55	4	224	4	135	39	12	–
MAR	3	360	3	61	83	62	3	183	3	83	54	21	–
APR	4	302	4	48	85	74	4	139	4	72	48	19	–
MAY	5	312	5	33	92	52	5	166	5	60	64	18	–
JUNE	4	275	4	27	90	34	4	161	4	48	70	16	–
JULY	3	230	3	23	50	29	3	160	3	50	69	15	–
AUG	3	360	2	18	92	35	3	72	3	88	40	6	–
SEPT	3	353	3	30	92	40	3	143	3	73	49	9	–
OCT	4	242	4	27	89	36	4	148	4	55	63	16	–
NOV	4	295	4	32	89	50	4	122	4	66	66	17	–
DEC	5	230	5	43	81	38	5	116	5	48	48	14	–
TOTAL	46	–	45	–	–	556	46	–	46	–	–	166	–
AVERAGE	–	336	–	58	82	–	–	148	–	74	52	–	–

NOTE – n is the number of samples taken

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF.		SECONDY. EFF.		M L S S CONCN mg/l	F/M lb BOD / lb MLSS	AIR USED 1000 cu ft / lb BOD	WASTE SLUDGE lb/DAY
		BOD mg/l	SS CONCN mg/l	BOD mg/l	SS CONCN mg/l				
JAN	.1	573	105	225	127	5330	.05	-	0
FEB	.5	465	126	92	135	5280	.14	-	0
MAR	.7	360	106	61	83	6240	.13	-	0
APR	1.0	242	94	45	72	5470	.14	-	0
MAY	.5	236	93	27	60	6500	.07	-	0
JUNE	.5	227	113	27	48	6630	.05	-	0
JULY	.4	203	113	23	50	6650	.05	-	0
AUG	.3	253	88	28	88	6980	.04	-	0
SEPT	.4	333	107	30	73	7000	.07	-	0
OCT	.6	210	118	27	55	6300	.06	-	0
NOV	.7	300	130	32	66	6760	.09	-	0
DEC	.6	188	62	43	48	6890	.06	-	0
TOTAL	-	-	-	-	-	-	-	-	-
AVERAGE	.5	299	105	55	75	6340	.08	-	0

SLUDGE DIGESTION and DISPOSAL

MONTH	RAW SLUDGE			LIQUID HAULED CU·YD·
	VOLUME 10^3 gal	TS %	VS %	
Jan.	21	-	-	128
Feb.	21	3.1	60	124
Mar.	59	-	-	352
Apr.	53	-	-	317
May	21	-	-	126
June	79	-	-	467
July	21	-	-	128
Aug.	31	-	-	181
Sept.	19	-	-	115
Oct.	19	-	-	112
Nov.	38	-	-	223
Dec.	35	-	-	209
Total	417	-	-	2482
Average	35	3.1	60	207

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Date Due

ONTARIO WATER RESOURCES COMMISSION
DIV. OF PLANT OPERATIONS.

ELMIRA -
WATER POLLUTION CONTROL PLANT.

TD/227/E55/W38/1970/MOE 1970

DATE | ISSUED TO | ASVS

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Ontario Water Resources Co
Elmira water
pollution control plant: asvs
1970 operating c.1 a aa
summary

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Water management in Ontario